

PATENT SPECIFICATION

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DRAWINGS ATTACHED

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(54) A CONVEYOR ARRANGEMENT FOR TROLLEYS

(71) We, INVENTIO AKTIENGESSELLSCHAFT, of Hergiswil NW, Switzerland, a joint stock company organised under the laws of Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a conveyor system.

According to the present invention, there is provided a conveyor system comprising a conveyor track which extends in its longitudinal direction between a first level and a second level and which comprises rails to guide trolleys therealong during transit of the trolleys between the first and second levels, at least one trolley which is arranged to run on the rails and which comprises entraining means depending therefrom, an endless drive member to drive trolleys along the rails, the drive member being provided with spaced entrainment members, and a casing having a passage formed therein, the entraining means of the or each trolley extending in operation of the conveyor system through the passage into the path of the entrainment members.

Preferably, the or each trolley comprises supporting wheels thereon, and the rails each have a part box-shaped cross-section providing four guide surfaces.

Conveniently, three of the guide surfaces are formed on a side wall portion, a flange extending from the side wall portion and a wheel bearing surface extending from the side wall portion, the arrangement being such that during transit of a trolley each wheel of the trolley is prevented from leaving the associated rail by engagement of the flange of that rail with an extended axle portion of that trolley wheel.

In an embodiment, the track consists of an entrance section slightly descending below the horizontal, the actual conveyor section which rises or descends and leads from one level to the other level, and an exit section which also descends slightly below the horizontal, the transitions between the sections being rounded

off. The trolleys, which generally have a front pair and rear pair of swivelling wheels or casters, run in the rails. The rails for the two pairs of wheels are arranged at different heights, so that during transportation the trolleys remain in an approximately horizontal position. In order to reduce the risk of derailment resulting from trolleys being positioned the wrong way round on the rails, a stop may be arranged on the side of each rail to abut a wheel axle which projects from one side of an incorrectly aligned wheel.

Embodiments of the invention will now be more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 shows an elevational view of a conveyor system showing two trolleys being conveyed upwards;

Fig. 2 shows a section through the conveyor system of Fig. 1;

Fig. 3 shows entraining means of Fig. 1 in detail;

Fig. 4 shows a back stop of Fig. 1; and

Fig. 5 shows a section through a conveyor system constructed for downward trolley transport.

In Figs. 1 to 3 there is shown a conveyor system including shopping trolleys 4, in which system a track 1 comprises a conveyor section 1.1 rising from a first storey 2 to a second storey 3, an entrance section 1.2 which descends towards the conveyor section 1.1 and an exit section 1.3 which descends towards the floor of the storey 3. The shopping trolleys 4 are each provided with four swivelling wheels or castors 4.1 of which the rear pair of wheels located on the operating side of the trolley 4 i.e. the side from which the trolley, in use, is pushed possess a wider track than the front pair of wheels. The trolleys 4 are driven on the conveyor by an endless drive chain 5 whose direction of movement is reversed at both ends of the track 1. For reversing the direction of motion of the drive chain 5 there is provided a guide roll 6 which co-operates with a tensioning device 7 and a drive roller 8 which is driven by an electric motor 12 via a chain drive 9 and a worm gear 10 with a

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brake 11. An intermediate guide roller 13 is provided at the transition between the conveyor section 1.1 and the exit section 1.3. At the bottom of the conveyor system the entire chain drive device and tensioning device are covered by a casing 14.

The drive chain 5 which comprises individual chain links 5.1 (Fig. 3) possesses, distributed at regular intervals over its entire length, entrainment members in the form of pins 15 which are mounted in brackets 5.2 fixed on to chain links 5.1 at intervals along the chain. In Fig. 1, the operative upward path of travel of the entraining pins 15 is indicated at 15.1. When a trolley 4 is conveyed, one of the entraining pins 15 engages in entraining means comprising a two-armed entraining fork 4.2 fixed on to the trolley 4. The arm of the entraining fork which is located at the front in the direction of movement of the trolley is marked 4.21 and the rear arm is marked 4.22. In the case of upwards conveying shown in Fig. 1, the entraining pin 15 rests on the front arm 4.21 of the entraining fork 4.2. The entraining pins 15 are made of noise-damping resilient material and are provided so close together that a number of entraining pins 15 are available within the length of a trolley. The drive chain 5, as can be seen from Fig. 2, is covered at the top over its entire length by means of plate members or casings 16, except for a longitudinal slit or passage 17 through which the entraining forks 4.2 of the trolley 4 engage in the path of travel 15.1 of the entraining pins 15.

In Fig. 2 it is also possible to see the parallel pairs of guide rails 18, 21 and 19, 20, respectively, for the wheel 4.1 of the trolleys 4 arranged on the track 1. These are located side by side in a common plane in the approximately horizontal entrance and exit sections 1.2, 1.3. On the inclined conveyor section 1.1 the two outside rails 18, 21 guiding the rear pair of wheels are displaced in spaced parallel relation to the inner two rails, 19, 20 guiding the front pair of wheels, so that the trolley 4 is maintained in an approximately horizontal position on the track 1. The wheel axles 4.11 of the wheels 4.1 each possess an extension 4.12 on one side. The guide rails 18, 19, 20, 21 have a basic channel-shaped cross-section modified to a part-box shape by a flange 18.1, 19.1, 20.1, 21.1 arranged to extend above the associated wheel axle extensions 4.12 with a clearance therebetween. On the ends of these flanges there are placed strips 22 of noise-damping resilient material. In this way positive guidance of the wheels 4.1 is achieved. The space between the equilateral guide rails 18, 19, or 20, 21 is covered in each case by a casing 23. By means of the extensions 4.12 of the wheel axles 4.11 the trolleys 4 are also prevented from entering the conveyor device the wrong way round as

compared with that in Fig. 1. For this purpose there are provided in the entrance section 1.2 stops (which are not shown in the drawings) against which the wheels bump if the wheels are in the wrong position.

In the entrance section 1.2, a back stop 24 is arranged to prevent a trolley 4, which has entered the ascending conveyor section 1.1 and is not immediately taken up by an entraining pin 15, from running back again into the entrance section 1.2. According to Fig. 4, such a back stop 24 comprises a two-armed lever 24.1 mounted so as to be capable of rotating in one of the guide rails and which is pressed by means of a tension spring 24.2 against a stop 24.3. When a trolley 4 runs into the conveyor section 1.1 one of the wheels 4.1 deflects the lever 24.1 against the bias of the spring 24.2. A trolley which runs back presses with one of its wheels 4.1 the lever 24.1 against its stop 24.3 and is stopped in this way.

As can be seen from Fig. 5, in the case of a conveyor arrangement for conveying trolleys downwards the guide rails 19, 20 for the pair of wheels with the narrow track are located above the guide rails 18, 21 of the pair of wheels of the trolley 4 with the wide track. During the downwards conveying the trolley 4 rests with the rear arm 4.22 of the entraining fork 4.2 on the entraining pin 15.

This arrangement of entraining fork 4.2 and entraining pin 15 permits practically complete covering of the moving drive chain 5 and the latter has no parts which project above the casing 16. The wheels 4.1 are positively guided over the entire conveying section 1.1 so that it is impossible for the trolley 4 to jump out of the guide rails 18, 19, 20, 21. This means a considerable reduction in the danger of injury and damage in the event of negligence or in the event of deliberate contact of the moving parts of the conveyor device by a person.

The entraining forks 4.2 or the entraining pins 15 may be arranged so that they are sprung in order to ensure a gentle take-over of the trolley 4. If the wheels 4.1 are suitably designed the cross-section of each guide rail can be arranged in such a way that it encloses substantially the entire wheel.

WHAT WE CLAIM IS:—

1. A conveyor system comprising a conveyor track which extends in its longitudinal direction between a first level and a second level and which comprises rails to guide trolleys therealong during transit of the trolleys between the first and second levels, at least one trolley which is arranged to run on the rails and which comprises entraining means depending therefrom, an endless drive member to drive trolleys along the rails, the drive

- member being provided with spaced entrainment members, and a casing having a passage formed therein, the entraining means of the or each trolley extending in operation of the conveyor system through the passage into the path of the entrainment members.
- 5 2. A conveyor system as claimed in claim 1, wherein the or each trolley comprises supporting wheels thereon, and the rails each have a part box-shaped cross-section providing four guide surfaces.
- 10 3. A conveyor system as claimed in claim 2, wherein three of the guide surfaces are formed on a side wall portion, a flange extending from the side wall portion and a wheel bearing surface extending from the side wall portion, the arrangement being such that during transit of a trolley each wheel of the trolley is prevented from leaving the associated rail by engagement of the flange of that rail with an extended axle portion of that trolley wheel.
- 20 4. A conveyor system substantially as hereinbefore described with reference to Figs. 1 to 4 of the accompanying drawings.
- 25 5. A conveyor system as claimed in claim 4, modified substantially as hereinbefore described with reference to Fig. 5 of the accompanying drawings.

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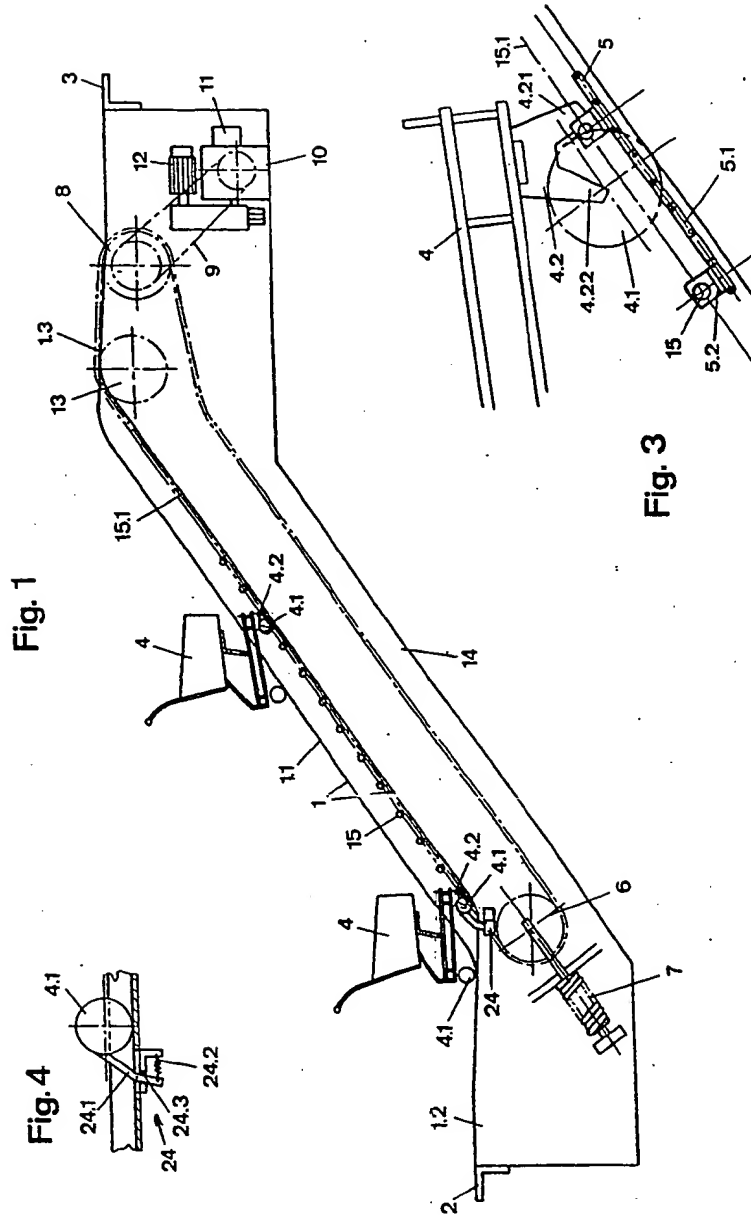


Fig. 2

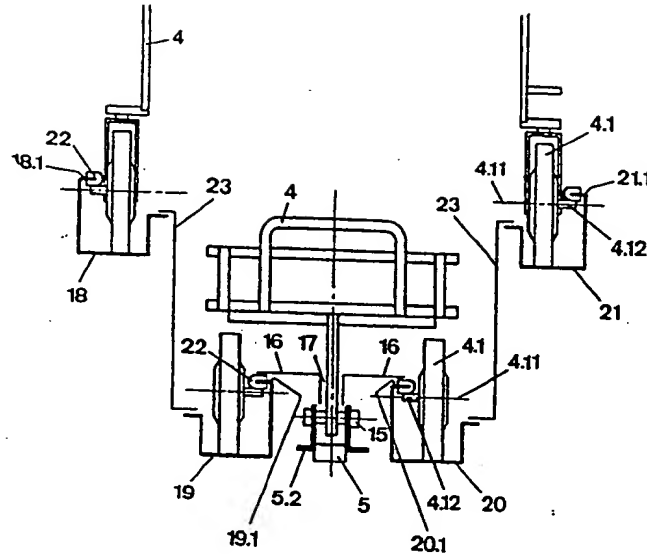


Fig. 5

